



## **S5221**

**Version 1.0**

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## Before you begin...

### Check the box contents!

The retail motherboard package should contain the following:

	<b>1x S5221 Motherboard</b>
	<b>4 x Serial ATA Cable</b>
	<b>1 x USB2.0 cable</b>
	<b>1 x S5221 User's manual</b>
	<b>1 x S5221 Quick reference guide</b>
	<b>1 x TYAN® Driver CD</b>
	<b>1 x I/O shield</b>



# Chapter 1: Instruction

---

## 1.1 - Congratulations

You have purchased one of the most powerful TYAN® S5221 motherboard. Based on Intel® chipset, S5221 is designed to support a serial of Intel® CPUs and two 240-pin DDR2 sockets up to 8GB un-buffered, non-ECC DDR2 667/800 MHz memory, providing a rich feature set and incredible performance. Leveraging advanced technology from Intel®, S5221 is capable of offering scalable 32 and 64-bit computing, high-bandwidth memory design, and lightning-fast PCI, PCI-E bus implementation.

S5221 not only empowers you in today's demanding IT environment but also offers a smooth path for future application usage. All of this provides S5221 the power and flexibility to meet the needs of nowadays application.

Remember to visit TYAN®'s Website at <http://www.tyan.com>. There you can find information on all of TYAN®'s products with FAQs, online manuals and BIOS upgrades.

## 1.2 - Hardware Specifications

Processor	Supported CPU Series	<ul style="list-style-type: none"><li>• Intel® Core™2 Extreme QX9000/QX6000 series processor</li><li>• Intel® Core™2 Quad Q9000/Q6000 series</li><li>• Intel® Core™2 Duo E8000/E7000/E6000/E4000 series</li><li>• Intel® Pentium® dual-core E2000 series</li><li>• Intel® Celeron® dual-core E1000 series</li><li>• Intel® Celeron® 400 series processor</li></ul>
	Socket Type / Q'ty	LGA 775 / (1)
	Max CPU wattage	130W
	System Bus (MHz)	Supports 800/1066/1333 MT/s
Chipset	GMCH / ICH	Intel Q35 / ICH9
	Super I/O	Winbond W83627 DHG-P
Memory	Supported DIMM Qty	(2) DIMM sockets
	DIMM Type / Speed	DDR2 667/800 ,non-ECC,UDIMM
	Capacity	Up to 8GB
	Memory channel	Dual channels (Dual-channel per CPU)
	Memory voltage	1.8V



<b>Expansion Slots</b>	<b>PCI-E</b>	(1) PCI-E x16 slot (x16 link from Q35 MCH) / (1) PCI 32-bit/33 MHz slot (from ICH9)
	<b>Recommended Tyan Riser Card</b>	<u>M2083-RS, PCI-E x16 1U riser card (left)</u> M2061→PCI-E x8 to PCI-X
<b>LAN</b>	<b>Port Q'ty</b>	(2)
	<b>Controller</b>	Intel 82574L
<b>Storage</b>	<b>Connector</b>	(4)
	<b>SATA Controller</b>	ICH9
	<b>Speed</b>	1.5 Gb/s
	<b>RAID</b>	N/A
<b>Graphic</b>	<b>Connector type</b>	D-Sub 15pin
	<b>Resolution</b>	2048x1536 @ 75 Hz refresh
	<b>Chipset</b>	Embedded graphics controller from Q35
<b>Input /Output</b>	<b>USB</b>	(7) USB2.0 ports (2 at rear, 4 via cable, 1 vertical)
	<b>COM</b>	(1) port (1 at rear )
	<b>VGA</b>	(1) D-Sub 15pin VGA port
	<b>RJ-45</b>	(2) GbE ports; (1) RJ45 for M3295-2 only
	<b>Power</b>	EPS12V Power Supply (24-pin, 8-pin power connectors), under 350W
	<b>SATA</b>	(4) SATA connectors
<b>System Monitoring</b>	<b>Chipset</b>	Winbond W83627DHG-P
	<b>Voltage</b>	Monitors voltage for CPU, memory, chipset & power supply
	<b>Fan</b>	Total (4) 4-pin headers
	<b>Temperature</b>	Monitors temperature for CPU & system environment
	<b>LED</b>	Fan fail LED indicator / Over temperature warning indicator
	<b>Others</b>	Chassis intrusion detection / Watch Dog timer
<b>Server Management</b>	<b>Optional Module</b>	Tyan Server Management Card M3295-2
	<b>M3295-2 Feature</b>	IPMI 2.0 Remote System Mgmt card <ul style="list-style-type: none"> <li>• Renesas H8S2167 BMC controller</li> <li>• BT, KCS, Logging support</li> <li>• IPMI-over-LAN</li> <li>• Remote power on/off and reset</li> </ul>



<b>BIOS</b>	<b>Brand / ROM size</b>	Phoenix/32M
	<b>Feature</b>	<ul style="list-style-type: none"> <li>• Supports ACPI 2.0</li> <li>• Supports boot from USB device</li> <li>• Power-on mode control for AC power loss recovery</li> </ul>
<b>Form Factor</b>	<b>Form Factor</b>	Flex-ATX
	<b>Board Dimension</b>	9.0 x 7.5" (229 x 191 mm)
<b>Operation System</b>	<b>OS supported list</b>	<a href="#">Please refer to our OS supported list.</a>
<b>Regulation</b>	<b>FCC (Doc)</b>	Class B
	<b>CE (Doc)</b>	•
	<b>C-Tick</b>	•
	<b>VCCI</b>	•
<b>Operating Environment</b>	<b>Operating Temp</b>	10° C ~ 35° C (50° F ~ 95° F)
	<b>Non-operating Temp</b>	- 40° C ~ 70° C (-40° F ~ 158° F)
	<b>In/Non-operating Humidity</b>	90%, non-condensing at 35° C
<b>RoHS</b>	<b>RoHS 6/6 Complaint</b>	•
<b>Accessory list</b>	<b>Motherboard</b>	(1) TYAN motherboard
	<b>Manual</b>	(1) User's manual / (1) Quick Ref. Guide
	<b>Installation CD</b>	(1) Tyan Installation CD
	<b>I/O Shield</b>	(1) I/O Shield
	<b>Cable</b>	(4) SATA cables; (1) USB2.0 cable
<b>Optional accessories for future upgrade</b>	<b>Server Management Card</b>	M3295-2

### 1.3 - Software Specifications

For OS (operation system) support, please check with TYAN® support for latest information.







## Chapter 2: Board Installation

---

You are now ready to install your motherboard.

### How to install our products right... the first time

The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

- (1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN® recommends wearing a static safety wrist strap.
- (2) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
- (3) Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
- (4) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
- (5) Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.



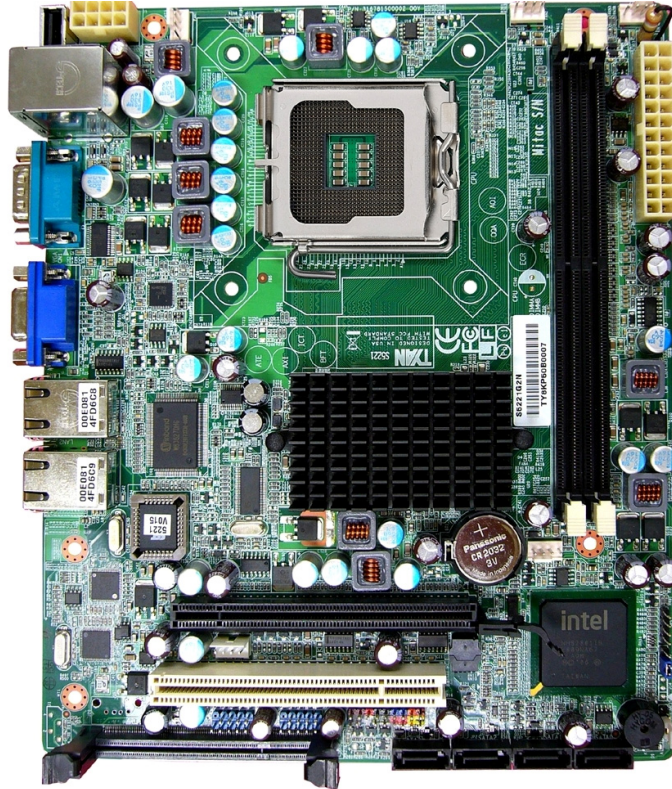
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**Note:**

**DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**



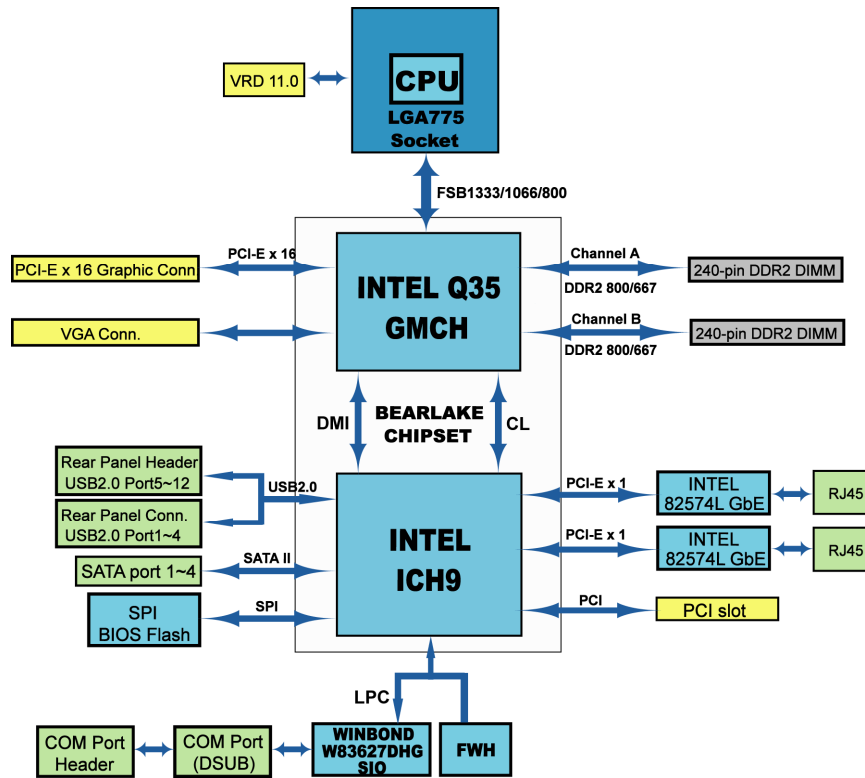
## 2.1 - Board Image



This picture is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above picture.



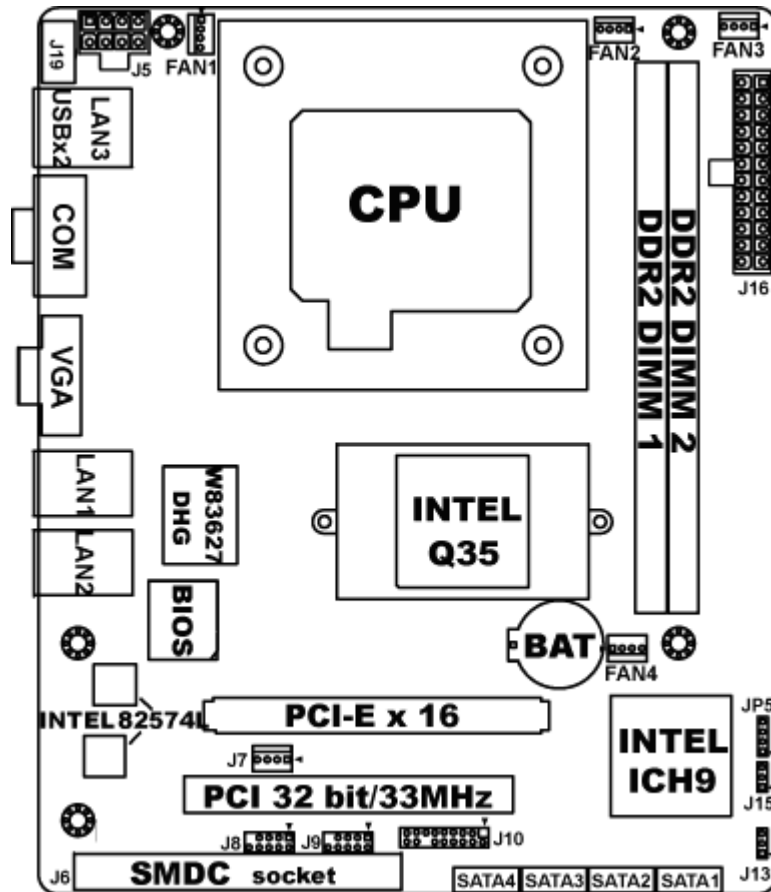
## 2.2 - Block Diagram



S5221 Block Diagram



## 2.3 - Board Parts, Jumpers and Connectors



This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram. But **for the DIMM number please refer to the above placement for memory installation.** For the latest board revision, please visit:



[www.TYAN.com](http://www.TYAN.com)



## Jumpers & Connectors

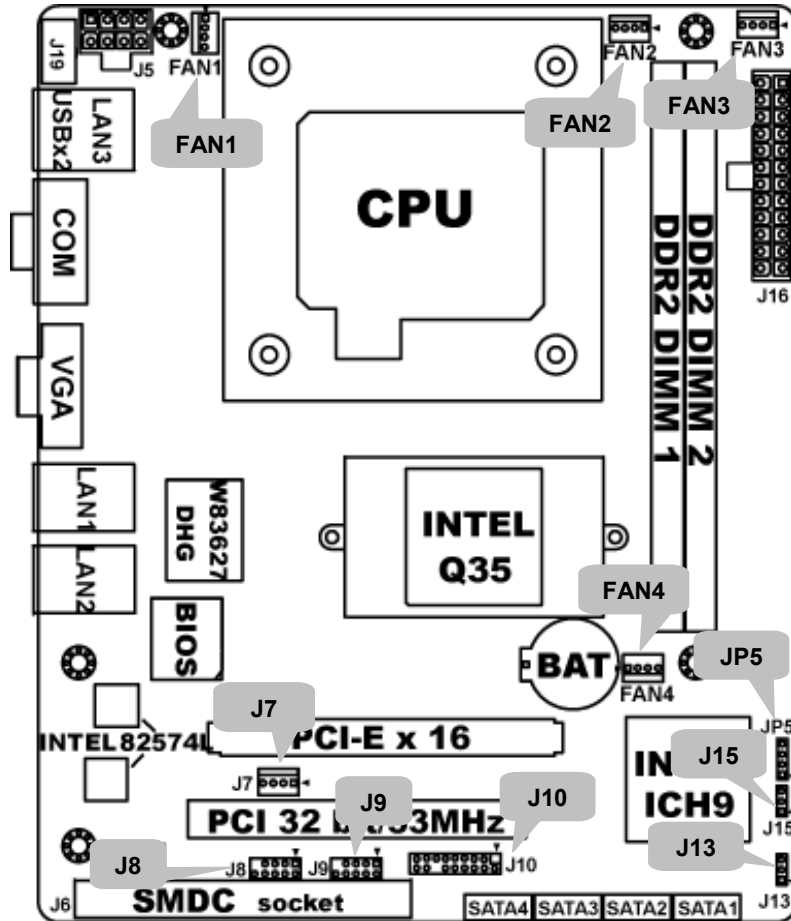
Jumper/Connector	Function
FAN1/2/3/4	Fan connector
J6	SMDC Socket (option)
J7	FDD Power Connector
J8/9	USB Connector
J10	TYFP1 Connector
J13	Clear CMOS Jumper
J15	WDT Jumper
J19	USB2.0 Port
JP5	Speaker Header

### Jumper Legend



	<b>OPEN - Jumper OFF</b>	Without jumper cover
	<b>CLOSED - Jumper ON</b>	With jumper cover



## Jumper Placement



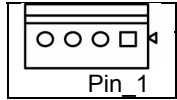
### J13: Clear CMOS Jumper

 <p>Pin_3 <span style="margin-left: 20px;">Pin_1</span> <b>Normal (Default)</b></p>	<p>You can reset CMOS by using this jumper if you have forgotten your system/setup password or need to clear BIOS setting.</p> <ol style="list-style-type: none"> <li>1. Power off system and disconnect both power connectors from the motherboard.</li> <li>2. Put jumper cap back to Pin_1 and Pin_2 (default setting).</li> <li>3. Use jumper cap to close Pin_2 and Pin_3 for seconds to Clear CMOS.</li> <li>4. Reconnect power &amp; power on system.</li> </ol>
 <p>Pin_3 <span style="margin-left: 20px;">Pin_1</span> <b>Clear CMOS</b></p>	

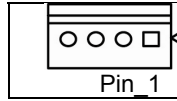


**FAN1/2/3/4: 4-Pin FAN Connector**

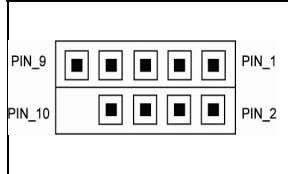
Pin	1	2	3	4
Signal	GND	+12V	FAN_TACH	FAN_PWM


**J7: FDD Power Connector**

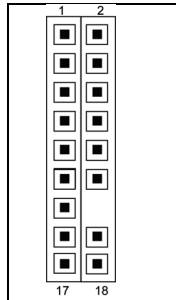
Pin	1	2	3	4
Signal	+12V	GND	GND	V5


**J8/J9: USB Connector**

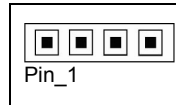
Signal	Pin	Pin	Signal
PWR	1	2	PWR
USB_A-	3	4	USB_B-
USB_A+	5	6	USB_B+
GND	7	8	GND
GND	9	10	KEY PIN

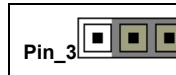
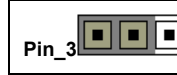

**J10: TYFP1 Connector**

Signal	Pin	Pin	Signal
HD LED+	1	2	Power LED+
HD LED-	3	4	Power LED-
GND	5	6	Power S/W+
Reset SW+	7	8	GND
GND	9	10	WLED+
NMI	11	12	WLED-
5Vsb	13	14	KEY PIN
SM Bus Data	15	16	GND
SM Bus Clock	17	18	INTRU#


**JP5: Speaker Header**

Pin	1	2	3	4
Signal	5V	NC	NC	SPKR

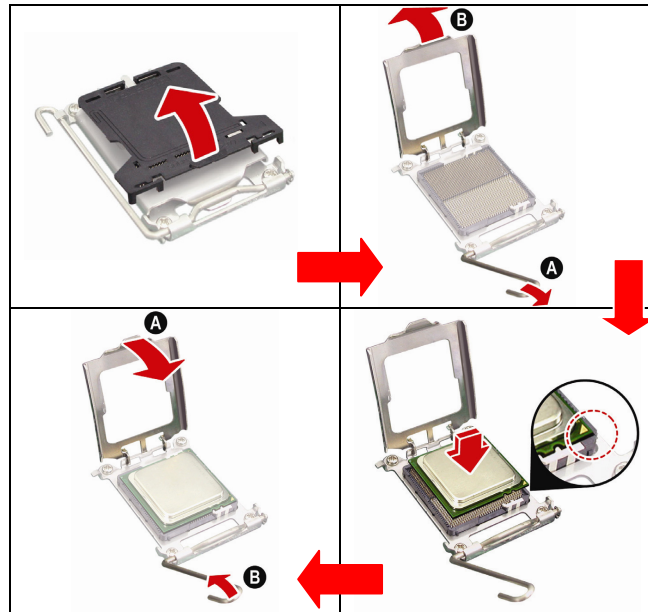

**J15: WDT Jumper**

	Pin1-2 closed: <b>RESET</b>
	Pin 2-3 closed: <b>NMI</b>



## 2.4 - Installing the Processor

Your brand S5221 supports Intel® serial CPUs as listed in Chapter 1.1. Check our website for latest processor support. <http://www.TYAN.com>  
**TYAN® is not liable for damage as a result of operating an unsupported configuration.**



The diagram is provided as a visual guide to help you to install the socket processor and may not be an exact representation of the processor you have.

- Step 1:** Take off the CPU protection cap.
- Step 2:** Pull the CPU lever up to unlock the CPU socket (A). Then open the socket in the direction as shown (B).
- Step 3:** Place the CPU on the CPU socket, ensuring that pin 1 is located in the right direction.
- Step 4:** Close the CPU socket cover (A) and press the CPU socket lever down to secure the CPU (B).

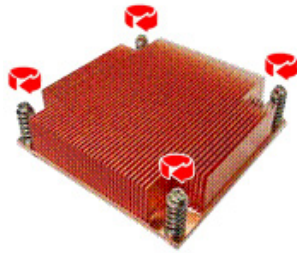


## 2.5 - Heat sink Installation

After installing the processor, you should proceed to install the heat sink. The CPU heat sink will ensure that the processor do not overheat and continue to operate at maximum performance for as long as you own them. The overheated processor is dangerous to the motherboard.

For the safest method of installation and information on choosing the appropriate heat sink, using heat sinks validated by Intel®. Please refer to Intel®'s website at [www.Intel.com](http://www.Intel.com)

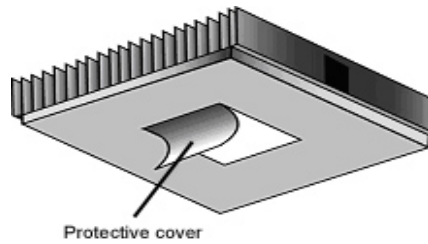
The following diagram illustrates how to install heat sink onto the CPU of S5221.



**Place the heat sink on top of the CPU and secure it to the motherboard using four screws clockwise.**

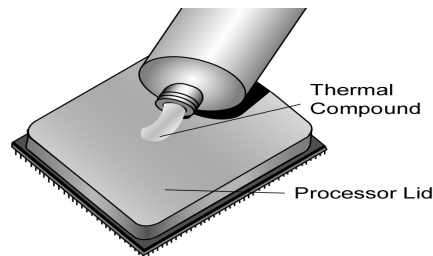


## 2.6 - Thermal Interface Material



There are two types of thermal interface materials designed for use with the processors.

The most common material comes as a small pad attached to the heat sink at the time of purchase. There should be a protective cover over the material. Take care not to touch this material. Simply remove the protective cover and place the heat sink on the processor.



The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).



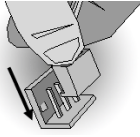
### Note:

Always check with the manufacturer of the heat sink & processor to ensure the Thermal Interface material is compatible with the processor & meets the manufacturer's warranty requirements.



## 2.7 - Finishing Installing the Heat sink

After you have finished installing the heat sink onto the processor and socket, attach the end wire of the fan (which should already be attached to the heat sink) to the motherboard. The following diagram illustrates how to connect fans onto the motherboard.

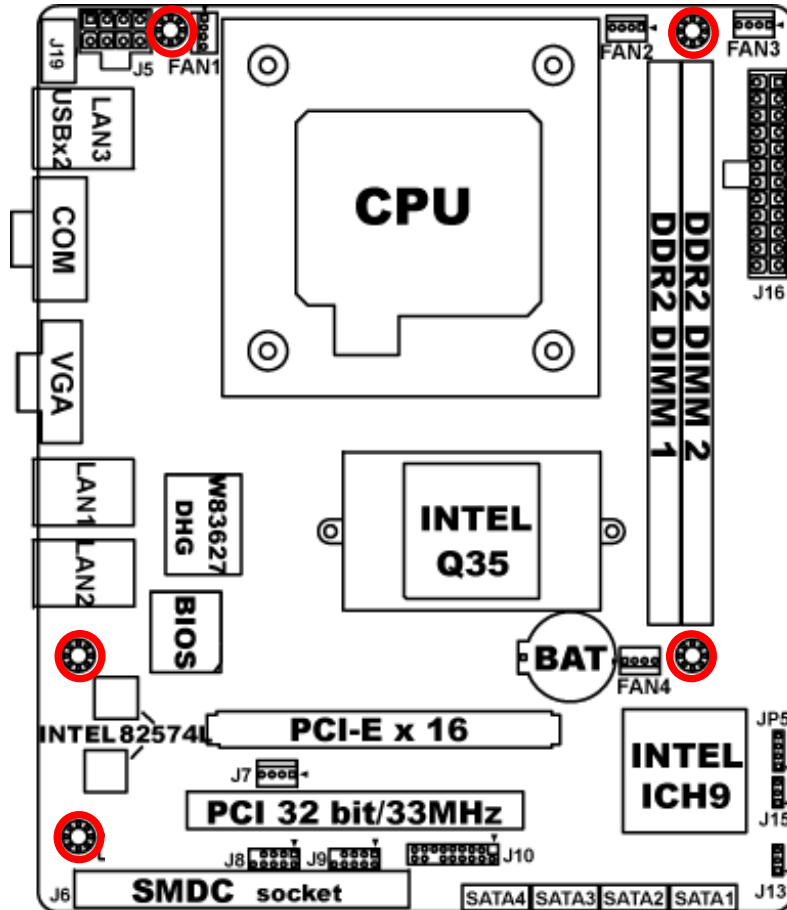


Once you have finished installing all the fans you can connect your drives (hard drives, CD-ROM drives, etc.) to your motherboard.



## 2.8 - Tips on Installing Motherboard in Chassis

Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs. If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case. If there are any studs missing, you will know right away since the motherboard will not be able to be securely installed.

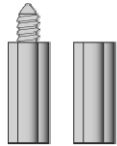

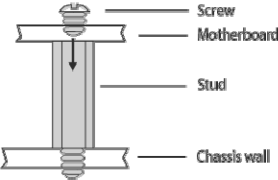
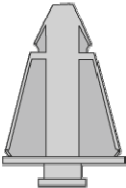
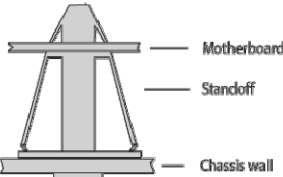
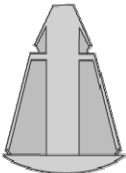
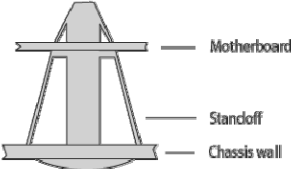
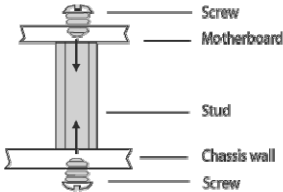




Some chassis' include plastic studs instead of metal. Although the plastic studs are usable, TYAN® recommends using metal studs with screws that will fasten the motherboard more securely in place.

Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

Mounting the Motherboard

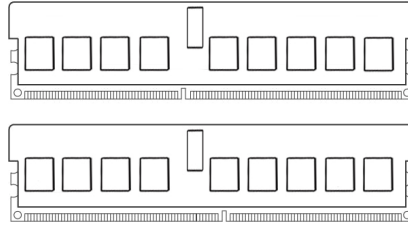
Type	Solutions for installing	
	 <div><div>Screw</div><div>Motherboard</div><div>Stud</div><div>Chassis wall</div></div>	 <div><div>Screw</div><div>Motherboard</div><div>Stud</div><div>Chassis wall</div></div>
	 <div><div>Motherboard</div><div>Standoff</div><div>Chassis wall</div></div>	
	 <div><div>Motherboard</div><div>Standoff</div><div>Chassis wall</div></div>	 <div><div>Screw</div><div>Motherboard</div><div>Stud</div><div>Chassis wall</div><div>Screw</div></div>



## 2.9 - Installing the Memory

Before installing memory, ensure that the memory you have is compatible with the motherboard and processor. Check the TYAN® web site at: [www.TYAN.com](http://www.TYAN.com) for details of the type of memory recommended for your motherboard.

The following diagram shows common memory modules:



- S5221 supports 256MB,512MB,1GB,2GB,4GB DIMM.
- Un-buffered, non-ECC DDR2-677/800 memory modules are supported.
- All installed memory will automatically be detected and no jumpers or settings need changing.

### **Note:**



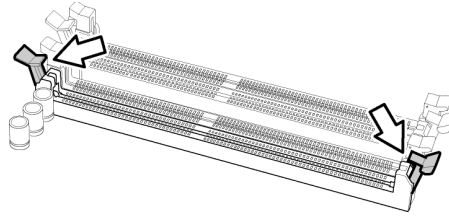
For the DIMM number please refer to the motherboard placement in “2.3 - Board Parts, Jumpers and Connectors” for memory installation.



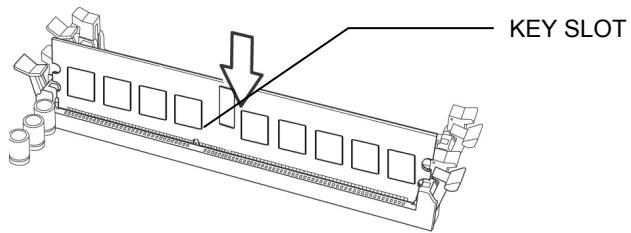
## Memory Installation Procedure

Follow these instructions to install memory modules into the S5221.

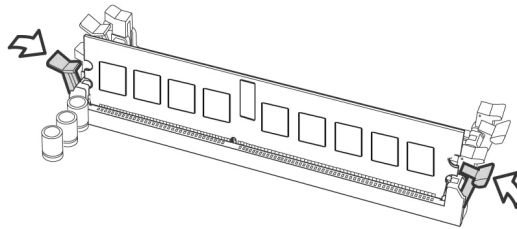
1. Press the locking levers in the direction shown in the following illustration.



2. Align the memory module with the socket. The memory module is keyed to fit only one way in the socket.



3. Seat the module firmly into the socket by gently pressing down until it sits flush with the socket. The locking levers pop up into place.





## 2.10 - Attaching Drive Cables

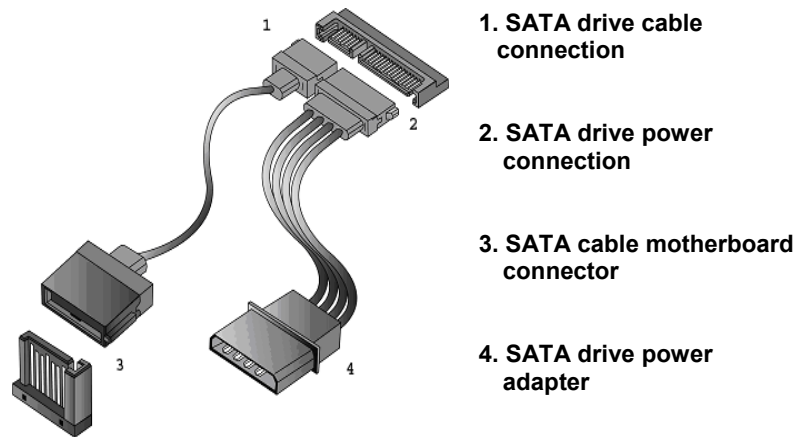
### Attaching Serial ATA Cables

S5221 is equipped with 4 Serial ATA (SATA) channels. Connections for the drives are very simple.

There is no need to set Master/Slave jumpers on SATA drives.

If you are in need of SATA/SAS cables or power adapters please contact your place of purchase.

The following pictures illustrate how to connect an SATA drive.





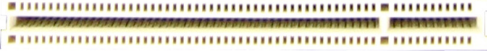
## 2.11 - Installing Add-In Cards

Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the slots that may appear on your motherboard.

### PCI-E x 16 slot



### PCI 32-bit slot



Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

**TIP:** It's good practice to install add-in cards in a staggered manner rather than making them directly adjacent to each other. Doing so allows air to circulate within the chassis more easily, thus improving cooling for all installed devices.



### Note:

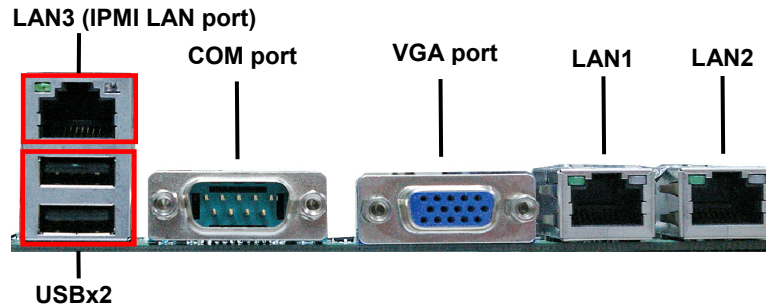
---

**YOU MUST ALWAYS** unplug the power connector to the motherboard before performing system hardware changes to avoid damaging the board or expansion device.



## 2.12 - Connecting External Devices

Your motherboard supports a number of different interfaces through connecting peripherals. See the following diagrams for the details.



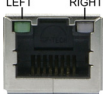
### Note:



Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

### Onboard LAN LED Color Definition

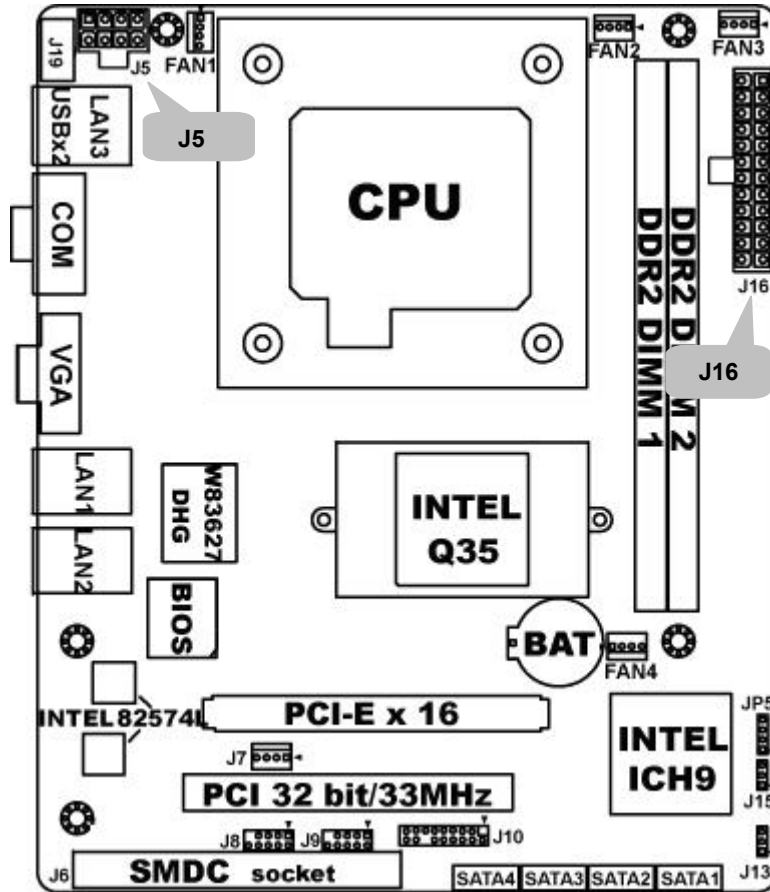
The two onboard Ethernet ports have green and yellow LEDs to indicate LAN status. The chart below illustrates the different LED states.

10/100/1000 Mbps LAN Link/Activity LED Scheme			
		Left LED	Right LED
10 Mbps	Link	Green	Off
	Active	Blinking Green	Off
100 Mbps	Link	Green	Green
	Active	Blinking Green	Green
1000 Mbps	Link	Green	Yellow
	Active	Blinking Green	Yellow
No Link		Off	Off



## 2.13 - Installing the Power Supply

There are **two** power connectors on your S5221. S5221 supports EPS 12V power supplies, please use below combination:




J5: 8-Pin EPS 12V PWR Connector

	Signal	Pin	Pin	Signal
	GND	1	5	+12V
	GND	2	6	+12V
	GND	3	7	+12V
	GND	4	8	+12V



#### J16: 24-Pin EPS 12V PWR main Connector

	Signal	Pin	Pin	Signal
	+3.3V	1	13	+3.3V
	+3.3V	2	14	-12V
	GND	3	15	GND
	+5V	4	16	PS_ON
	GND	5	17	GND
	+5V	6	18	GND
	GND	7	19	GND
	PS_GD	8	20	Reset
	5VSB	9	21	+5V
	+12V	10	22	+5V
	+12V	11	23	+5V
	+3.3V	12	24	GND



#### Note:

**YOU MUST** unplug the power supply before plugging the power cables to motherboard connectors.

## 2.14 - Finishing Up

Congratulations on making it this far! You have finished setting up the hardware aspect of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly, especially IDE cables and most importantly, jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly. In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by **calling your vendor's support line.**



### 3.1 - About the BIOS

The BIOS is the basic input/output system, the firmware on the motherboard that enables your hardware to interface with your software. The BIOS determines what a computer can do without accessing programs from a disk. The BIOS contains all the code required to control the keyboard, display screen, disk drives, serial communications, and a number of miscellaneous functions. This chapter describes the various BIOS settings that can be used to configure your system.

The BIOS section of this manual is subject to change without notice and is provided for reference purposes only. The settings and configurations of the BIOS are current at the time of print and are subject to change, and therefore may not match exactly what is displayed on screen.

This section describes the BIOS setup program. The setup program lets you modify basic configuration settings. The settings are then stored in a dedicated, battery-backed memory (called NVRAM) that retains the information even when the power is turned off.

**To start the BIOS setup utility:**

1. Turn on or reboot your system.
2. Press <F2> during POST to start the BIOS setup utility.

#### 3.1.1 - Setup Basics

The table below shows how to navigate in the setup program using the keyboard.

Key	Function
Tab	Moves from one selection to the next
Left/Right Arrow Keys	Changes from one menu to the next
Up/Down Arrow Keys	Moves between selections
Enter	Opens highlighted section
PgUp / PgDn Keys	Changes settings.

#### 3.1.2 - Getting Help

Pressing [F1] will display a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press [ESC] or the [F1] key again.



### 3.1.3 - In Case of Problems

If you have trouble booting your computer after making and saving the changes with the BIOS setup program, you can restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS. The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are absolutely sure of what you are doing. The Chipset defaults have been carefully chosen either by TYAN® or your system manufacturer for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

### 3.1.4 Setup Variations

Not all systems have the same BIOS setup layout or options. While the basic look and function of the BIOS setup remains more or less the same for most systems, the appearance of your Setup screen may differ from the charts shown in this section. Each system design and chipset combination requires a custom configuration. In addition, the final appearance of the Setup program depends on the system designer. Your system designer may decide that certain items should not be available for user configuration, and remove them from the BIOS setup program.

#### **Note:**

---



The following pages provide the details of BIOS menu. Please be noticed that the BIOS menu are continually changing due to the BIOS updating. The BIOS menu provided are the most updated when this manual is written. Please visit TYAN®'s website at <http://www.TYAN.com> for the information of BIOS updating.



## 3.2 - BIOS Main Menu

The Main BIOS Menu is the first screen that you can navigate. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often, a text message will accompany it.

Phoenix cME First BIOS Pro Setup Utility		
Main	Advanced	Security
System Time: [xx:xx:xx]		Item Specific Help
System Date: [xx/xx/xxxx]		[Tab], [Shift-Tab], or [Enter] selects field.
Legacy Diskette A: [Disabled]		
▶ SATA Port 1 [None]		
▶ SATA Port 2 [None]		
▶ SATA Port 3 [None]		
▶ SATA Port 4 [None]		
▶ SATA Port 5 [None]		
▶ SATA Port 6 [None]		
▶ Ext. Primary Master [None]		
▶ Ext. Primary Slave [None]		
▶ Memory Cache		
▶ Boot Features		
F1 Help ↑ ↓ Select Item -/+ Change Values F9 Setup Defaults		
Esc Exit ← → Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit		

### System Time / Date setup

System Time: Adjusts the system clock.

HH Hours (24hr. format)

MM Minutes

SS Seconds

System Date: Adjusts the system date.

MM Months

DD Days

YYYY Years

### Legacy Diskette A

Defines the floppy drive type NONE / 360K, 5.25 in / 1.2 M, 5.25 in / 720 K, 3.5 in / 1.44 M, 3.5 in / 2.88 M, 3.5 in



### 3.2.1 SATA Port Setup

Phoenix cME First BIOS Pro Setup Utility		
<b>Main</b>		
SATA Port X	[None]	Item Specific Help
Type:	[Auto]	User = your enter parameters of hard-disk drive installed at this connection. Auto = autotypes hard-disk drive installed here. 1-39 = you select pre-determined type of hard-disk drive installed here. CD-ROM = a CD-ROM drive is installed here. ATAPI Removable = removable disk drive is installed here.
Multi-Sector Transfers:	[Disabled]	
LBA Mode Control:	[Disabled]	
32 Bit I/O:	[Disabled]	
Transfer Mode:	[Disabled]	
Ultra DMA Mode:	[Disabled]	
F1 Help   ↑ ↓ Select Item   -/+ Change Values   F9 Setup Defaults Esc Exit   ← → Select Menu   Enter Select ► Sub-Menu   F10 Save and Exit		

The system displays advanced details like the number of heads/cylinders/sectors on the detected disk and the maximum storage capacity of the disk.

This option lets you set the following hard disk parameters:

#### Type

Selects the type of device connected to the system.

**Auto** / CD/DVD / Not Installed / ARMD

#### Multi-Sector Transfers

This option allows you to specify the number of sectors per block for multiple sector transfers.

**Disabled** / 2 Sectors / 4 Sectors / 8 Sectors / 16 Sectors

#### LBA Mode Control

Enables or disables LBA Mode.

When LBA is turned on, the BIOS will enable geometry translation. This translation may be done in the same way that it is done in Extended CHS or large mode, or it may be done using a different algorithm called LBA-assist translation. The translated geometry is still what is presented to the operating system for use in Int 13h calls. The difference between LBA and ECHS is that when using ECHS the BIOS translates the parameters used by these calls from the translated geometry to the drive's logical geometry. With LBA, it translates from the translated geometry directly into a logical block (sector) number.

**Disabled** / Enabled



### **32 Bit I/O**

Enables or disables 32 bit data transfer mode.

Enabling this option causes the PCI hard disk interface controller to bundle together two 16-bit chunks of data from the drive into a 32-bit group, which is then transmitted to the processor or memory. This results in a small performance increase.

**Disabled** / Enabled

### **Transfer Mode**

These modes determine the speed at which data is transferred to and from the drive. The Auto option automatically determines the correct transfer rates.

**Standard** / Fast PIO 1 / Fast PIO 2 / Fast PIO 3 / Fast PIO 4 / FPIO 3 / DMA 1 / FPIO 4 / DMA 2

### **Ultra DMA Mode**

Enables or disables Ultra DMA Mode.

Ultra DMA (UDMA, or, more accurately, Ultra DMA/33) is a protocol for transferring data between a hard disk drive through the computer's data paths (or bus) to the computer's random access memory (RAM). The Ultra DMA/33 protocol transfers data in burst mode at a rate of 33.3 MBps (megabytes per second), twice as fast as the previous Direct Memory Access (DMA) interface.

Ultra DMA support in your computer means that it will boot (start) and open new applications more quickly. It will also help users of graphics-intensive and other applications that require large amounts of access to data on the hard drive. Ultra DMA uses Cyclical Redundancy Checking (CRC), offering a new level of data protection.

**Disabled** / Mode 0 / Mode 1 / Mode 2 / Mode 3 / Mode 4 / Mode 5 / Mode 6



### 3.2.2 - Ext. Primary Master Setup

Phoenix cME First BIOS Pro Setup Utility		
Main		
Ext. Primary Master	[None]	Item Specific Help
Type:	[Auto]	User = your enter parameters of hard-disk drive installed at this connection. Auto = autotypes hard-disk drive installed here. 1-39 = you select pre-determined type of hard-disk drive installed here. CD-ROM = a CD-ROM drive is installed here. ATAPI Removable = removable disk drive is installed here.
Multi-Sector Transfers:	[Disabled]	
LBA Mode Control:	[Disabled]	
32 Bit I/O:	[Disabled]	
Transfer Mode:	[Disabled]	
Ultra DMA Mode:	[Disabled]	
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults Esc Exit    ← → Select Menu    Enter Select ► Sub-Menu    F10 Save and Exit		

### 3.2.3 - Ext. Primary Slave Setup

Phoenix cME First BIOS Pro Setup Utility		
Main		
Ext. Primary Slave	[None]	Item Specific Help
Type:	[Auto]	User = your enter parameters of hard-disk drive installed at this connection. Auto = autotypes hard-disk drive installed here. 1-39 = you select pre-determined type of hard-disk drive installed here. CD-ROM = a CD-ROM drive is installed here. ATAPI Removable = removable disk drive is installed here.
Multi-Sector Transfers:	[Disabled]	
LBA Mode Control:	[Disabled]	
32 Bit I/O:	[Disabled]	
Transfer Mode:	[Disabled]	
Ultra DMA Mode:	[Disabled]	
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults Esc Exit    ← → Select Menu    Enter Select ► Sub-Menu    F10 Save and Exit		



### 3.2.4 - Memory Cache

This setting allows you to tweak the various cache settings for optimal performance of your system. Press Enter to display the various cache settings.

Phoenix cME First BIOS Pro Setup Utility		
<b>Main</b>		
Memory Cache		Item Specific Help
Cache System BIOS area:	[Write Protect]	Controls caching of system BIOS area.
Cache Video BIOS area:	[Write Protect]	
Cache Base 0-512K:	[Write Back]	
Cache Base 512K-640K:	[Write Back]	
Cache Extended Memory	[Write Back]	
Cache A000 – AFFF:	[Disabled]	
Cache B000 – BFFF:	[Write Protect]	
Cache C800 – CBFF:	[Write Protect]	
Cache CC00 – CFFF:	[Disabled]	
Cache D000 – D3FF:	[Disabled]	
Cache D400 – D7FF:	[Disabled]	
Cache D800 – DBFF:	[Disabled]	
Cache DC00 – DFFF:	[Disabled]	
Cache E000 – E3FF:	[Write Protect]	
Cache E400 – E7FF:	[Write Protect]	
F1 Help   ↑ ↓ Select Item   -/+ Change Values   F9 Setup Defaults Esc Exit   ← → Select Menu   Enter Select ► Sub-Menu   F10 Save and Exit		

#### Cache System BIOS Area

This feature is only available when the system BIOS is shadowed. It enables or disables the caching of the system BIOS ROM at F0000h-FFFFFh via the L2 cache. This greatly speeds up accesses to the system BIOS. However, this does not necessarily make the system perform better because the OS does not need to access the system BIOS often.

As such, it would be a waste of L2 cache bandwidth to cache the system BIOS instead of data that are more critical to the system's performance. In addition, if any program writes into this memory area, it will result in a system crash. So, it is recommended that you write protect this area for optimal system performance.

Uncached / **Write Protect**

#### Cache Video BIOS Area

This feature is only valid when the video BIOS is shadowed. It enables or disables the caching of the video BIOS ROM at C0000h-C7FFFh via the L2 cache. This greatly speeds up accesses to the video BIOS. However, this does not necessarily make the system perform better



because the OS bypasses the BIOS and uses the graphics driver to access the video card's hardware directly.

As such, it would be a waste of L2 cache bandwidth to cache the video BIOS instead of data that are more critical to the system's performance. In addition, if any program writes into this memory area, it will result in a system crash. So, it is recommended that you write protect this area for optimal system performance.

Uncached / **Write Protect**

#### **Cache Base 0-512K**

This feature allows you to control caching of 512K base memory.

Uncached / Write Through / Write Protect / **Write Back**

#### **Cache Base 512K-640K**

This feature allows you to control caching of 512K 640K base memory.

Uncached / Write Through / Write Protect / **Write Back**

#### **Cache Extended Memory Area**

This feature allows you to control caching of system memory above one megabyte.

Uncached / Write Through / Write Protect / **Write Back**

#### **Cache A000-AFFF/B000-BFFF**

These features allow you to control caching of A000-AFFF/B000-BFFF memory.

**Disabled** / USMC Caching / Write Through / Write Protect / Write Back

#### **Cache C800-CBFF/Cache CC00-CFFF**

These features allow you to control caching of C800-CBFF/CC00-CFFF memory.

Disabled / Write Through / **Write Protect** / Write Back

#### **Cache D000-D3FF/Cache D400-D7FF/Cache D800-DBFF/Cache DC00-DFFF**

These features allow you to control caching of D000-D3FF/D400-D7FF/D800-D8FF/DC00-DFFF memory.

**Disabled** / Write Through / Write Protect / Write Back

#### **Cache E000-E3FF/Cache E400-E7FF / Cache E800-EBFF / Cache EC00-EFFF**

These features allow you to control caching of C800-CBFF/CC00-CFFF/Cache E800-EBFF / Cache EC00-EFFF memory.

Disabled / Write Through / **Write Protect** / Write Back



### 3.2.5 - Boot features Setup

Phoenix cME First BIOS Pro Setup Utility		
Main		
Boot Features		Item Specific Help
Floppy check:	[Disabled]	Enabled verifies floppy type on boot; disabled speeds boot.
Halt on Errors:	[All Errors]	
Keyboard Error Report	[Enabled]	
Summary screen:	[Enabled]	
Boot-time Diagnostic Screen:	[Enabled]	
Quick Boot Mode:	[Enabled]	
Extended Memory Testing	[Just zero it]	
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults		
Esc Exit    ← → Select Menu    Enter Select ► Sub-Menu    F10 Save and Exit		



### 3.3 - BIOS Advanced Menu

This section facilitates configuring advanced BIOS options for your system.

Phoenix cME First BIOS Pro Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
<div>Setup Warning</div> <div>Setting items on this menu to incorrect values may cause your system to malfunction.</div> <div>▶ Advanced Chipset Control</div> <div>▶ Advanced Processor Options</div> <div>▶ I/O Device Configuration</div> <div>▶ DMI Event Logging</div> <div>Reset Configuration Data: [No]</div> <div>Large Disk Access Mode: [DOS]</div> <div>Legacy USB Support: [Enabled]</div> <div>▶ Hardware Monitor</div> <div>▶ Console Redirection</div>				Item Specific Help	
				Select options for Advanced Chipset features.	
<div>F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults</div> <div>Esc Exit    ← → Select Menu    Enter Select ▶ Sub-Menu    F10 Save and Exit</div>					

#### Reset Configuration Data

If you install a new piece of hardware or modify your computer's hardware configuration, the BIOS will automatically detect the changes and reconfigure the ESCD (Extended System Configuration Data). Therefore, there is usually no need to manually force the BIOS to reconfigure the ESCD.

However, sometimes, the BIOS may not be able to detect the hardware changes. A serious resource conflict may occur and the operating system may not even boot as a result. This is where the Reset Configuration Data BIOS feature comes in.

This BIOS feature allows you to manually force the BIOS to clear the previously saved ESCD data and reconfigure the settings. All you need to do is enable this BIOS feature and then reboot your computer. The new ESCD should resolve the conflict and allow the operating system to load normally.

Please note that the BIOS will automatically reset it to the default setting of No after reconfiguring the new ESCD. So, there is no need for you to manually disable this feature after rebooting.

**No** / Yes



### 3.3.1 - Advanced Chipset Control

Phoenix cME First BIOS Pro Setup Utility	
Advanced	
Advanced Chipset Control	Item Specific Help
<ul style="list-style-type: none"><li>► Integrated Device Control Sub Menu</li><li>► PCI Express Sub-Menu<ul style="list-style-type: none"><li>WatchDog Mode [Disabled]</li><li>Memory Reclaiming [Enabled]</li><li>Default Primary Video Adapter: [Auto]</li><li>IGD – Device 2: [Auto]</li><li>IGD – Device 2, Function 1: [Auto]</li><li>DVMT 4.0 Mode : [Auto]</li><li>DVMT Graphics Memory : 127MB</li><li>Azalia Audio [Auto]</li><li>Enable Multimedia Timer [No]</li><li>Serial ATA : [Enabled]</li><li>Native Mode Operation : [Auto]</li></ul></li></ul>	These items determine whether the integrated PCI Devices will be Enabled in PCI Config Space.
<div>F1 Help   ↑ ↓ Select Item   -/+ Change Values   F9 Setup Defaults Esc Exit   ← → Select Menu   Enter Select ► Sub-Menu   F10 Save and Exit</div>	



### 3.3.1.1 - Integrated Device Control Sub Menu

Phoenix cME First BIOS Pro Setup Utility	
Advanced	
Integrated Device Control Sub Menu	Item Specific Help
► LAN Control Sub-Menu USB Dev #29 [Fun #0,1,2,3,7] USB Dev #26 [Fun #0,1,2,7]	These items control LAN devices.
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults Esc Exit   ← → Select Menu   Enter Select ► Sub-Menu   F10 Save and Exit	

### 3.3.1.2 - PCI Express Sub-Menu

Phoenix cME First BIOS Pro Setup Utility	
Advanced	
PCI Express Sub-Menu	Item Specific Help
PCI Express Base Address = F8000000h GMCH Base Address        = FED14000h DMI Base Address         = FED18000h Egress Port Base Address = FED19000h  ► PCI E1 Sub-Menu ICH9 RCB Base Address = FED1C000h  ► PCI E2 Sub-Menu	These items are for debugging the PCI Express Graphics Port.
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults Esc Exit   ← → Select Menu   Enter Select ► Sub-Menu   F10 Save and Exit	



### 3.3.1.2.1 - PCI E1 Sub-Menu

Phoenix cME First BIOS Pro Setup Utility		
<b>Advanced</b>		
PCI E1 Sub-Menu		Item Specific Help
PCI Express Graphics Port	[Auto]	Disabled – Port always disabled.
PEG Port Enabled	= No	Enabled - Port always enabled.
PEG Port Number	= 00h	Auto – Only enable if card found.
PEG Width	= x0	Debug – Only enable if card found.
PEG Port Slot Number	= 0000h	Don't force link width
PEG Power Limit	= 0 watts	
PEG Port Slot Card Detect	= No	
<b>F1</b> Help <b>↑ ↓</b> Select Item <b>-/+</b> Change Values <b>F9</b> Setup Defaults <b>Esc</b> Exit <b>← →</b> Select Menu <b>Enter</b> Select ► Sub-Menu <b>F10</b> Save and Exit		

### 3.3.1.2.2 - PCI E2 Sub-Menu

Phoenix cME First BIOS Pro Setup Utility		
<b>Advanced</b>		
PCI E2 Sub-Menu		Item Specific Help
PCI E Port 1	[Auto]	Enabled/Disabled the PCI-E root port
Port #1 Enabled	= Yes	
Port #1 Number	= 01h	
Port #1 Width	= x0	
Port #1 Slot Number	= 0000h	
Port #1 Power Limit	= 0 watts	
Port #1 Port Slot Card Detect	= No	
<b>F1</b> Help <b>↑ ↓</b> Select Item <b>-/+</b> Change Values <b>F9</b> Setup Defaults <b>Esc</b> Exit <b>← →</b> Select Menu <b>Enter</b> Select ► Sub-Menu <b>F10</b> Save and Exit		



### 3.3.2 – Advanced Processor Options

Phoenix cME First BIOS Pro Setup Utility		
Advanced		
Advanced Processor Options		Item Specific Help
Core Multi-Processing :	[Enabled]	Determines whether the 2nd core is enabled. Disabled = 2 nd core is disabled. Enabled = 2 nd core is enabled.
Machine Checking	[Enabled]	
Compatible FPU Code	[Disabled]	
Thermal Management 2	[Enabled]	
Set Max Ext CPUID = 3	[Disabled]	
C1 Enhanced Mode	[Disabled]	
PECI Interface:	[Enabled]	
Intel(R) Virtualization Technology	[Disabled]	
No Execute Mode Mem Protection	[Enabled]	
Processor Power Management: [GV1/GV3 On1]		
<b>F1</b> Help <b>↑ ↓</b> Select Item <b>-/+</b> Change Values <b>F9</b> Setup Defaults <b>Esc</b> Exit <b>← →</b> Select Menu <b>Enter</b> Select ► Sub-Menu <b>F10</b> Save and Exit		

### 3.3.3 – I/O Device Configuration

Phoenix cME First BIOS Pro Setup Utility		
Advanced		
I/O Device Configuration		Item Specific Help
Floppy disk controller:	[Enabled]	Configure using these options:  [Disabled] No configuration [Enabled] User configuration [Auto] BIOS or OS chooses configuration (OS Controlled) Displayed when controlled by OS
Serial port A:	[Enabled]	
Base I/O address:	[3F8]	
Interrupt:	[IRQ 4]	
Serial port B:	[Enabled]	
Mode:	[Normal]	
Base I/O address:	[2F8]	
Interrupt:	[IRQ 3]	
<b>F1</b> Help <b>↑ ↓</b> Select Item <b>-/+</b> Change Values <b>F9</b> Setup Defaults <b>Esc</b> Exit <b>← →</b> Select Menu <b>Enter</b> Select ► Sub-Menu <b>F10</b> Save and Exit		



### 3.3.4 – DMI Event Logging

Phoenix cME First BIOS Pro Setup Utility		
<b>Advanced</b>		
DMI Event Logging		Item Specific Help
Event log validity	Valid	View the contents of the DMI event log.
Event log capacity	Space Available	
View DMI event log	[Enter]	
Event Logging	[Enabled]	
Mark DMI events as read	[Enter]	
Clear all DMI event logs	[No]	
<b>F1</b> Help <b>↑ ↓</b> Select Item <b>-/+</b> Change Values <b>F9</b> Setup Defaults <b>Esc</b> Exit <b>← →</b> Select Menu <b>Enter</b> Select ► Sub-Menu <b>F10</b> Save and Exit		

### 3.3.5 - Hardware Monitor

Phoenix cME First BIOS Pro Setup Utility		
Advanced		
Hardware Montior		Item Specific Help
►Voltage Monitoring		
FAN1	XXXX	
FAN2	XXXX	
FAN3	XXXX	
FAN4	XXXX	
CPU Belwow Tmax=	C	
Ambient1 Temp.=	C/F	
Ambient2 Temp.=	C/F	
FAN Fail LED Indicator	[Disabled]	
Auto Fan Control	[Disabled]	
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults Esc Exit    ← → Select Menu    Enter Select ► Sub-Menu    F10 Save and Exit		



### 3.3.6 - Console Redirection

Phoenix cME First BIOS Pro Setup Utility		
Advanced		
Console Redirection		Item Specific Help
COM Port Address	[Disabled]	If enabled, it will use a port on the motherboard.
Baud Rate	[19.2K]	
Console Type	[VT100]	
Flow Control	[CTS/RTS]	
Console Connection	[Direct]	
Continue C.R. after POST:	[OFF]	
F1 Help   ↑ ↓ Select Item   -/+ Change Values   F9 Setup Defaults Esc Exit   ← → Select Menu   Enter Select ► Sub-Menu   F10 Save and Exit		



### 3.4 - Security Menu

These settings allow you to configure the security options for your system.

Phoenix cME First BIOS Pro Setup Utility					
Main	Advanced	<b>Security</b>	Power	Boot	Exit
Supervisor Password Is : Clear			Item Specific Help		
User Password Is : Clear			Supervisor Password controls access to the setup utility.		
Set Supervisor Password [Enter]					
Set User Password [Enter]					
Diskette access: [Supervisor]					
Fixed disk boot sector: [Normal]					
Password on boot: [Disabled]					
<b>F1</b> Help <b>↑ ↓</b> Select Item <b>-/+</b> Change Values <b>F9</b> Setup Defaults					
<b>Esc</b> Exit <b>← →</b> Select Menu <b>Enter</b> Select ► Sub-Menu <b>F10</b> Save and Exit					

The system displays the current supervisor and user passwords.

#### Set Supervisor Password

This option allows the supervisor to set the supervisor password to restrict access to the BIOS settings.

#### Set User Password

This option allows the user to set the user password.

#### Password on boot

When enabled, the system will ask for a password at every boot. The system will continue booting only if the correct password is entered. If the wrong password is entered three times, the system will automatically shut down.

**Disabled** / Enabled



### 3.5 - Power Menu

Phoenix cME First BIOS Pro Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
Resume Time: Resume Time: Chassis Intrusion Detect: Power On By PCI After Power Failure:		[S1/S3]	Item Specific Help  Select one of the ACPI power states: S1,S2,or S3. If selected, the corresponding power state will support.		
		[Off]			
		[00:00:00]			
		[No]			
		[Disabled]			
		[Stay Off]			
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults Esc Exit    ← → Select Menu    Enter Select ► Sub-Menu    F10 Save and Exit					

#### After Power Failure

This option is used to specify the mode of operation after the system recovers from a power loss.

Stay off / Power on / **Last State**



### 3.6 - Boot Menu

Use this screen to select options for the Boot Settings Configuration.

Phoenix cME First BIOS Pro Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
Boot priority order: 1 2 3 4 5 6 7 8 Excluded from boot order: :Legacy Network Card :Bootable Add-in Cards				Item Specific Help  Keys used to view or configure devices: <+> and <-> moves the device up or down. <f> + <r> specifies the device fixed or removable. <x> exclude or include the device to boot. <Shift + 1> enables or disables a device. <1-4> Loads default boot sequence.	
F1 Help    ↑ ↓ Select Item    -/+ Change Values    F9 Setup Defaults Esc Exit    ← → Select Menu    Enter Select ► Sub-Menu    F10 Save and Exit					

The boot menu will list all bootable devices. Use <Enter> to expand or collapses devices with a '+' or '-'. Use <+> or <-> to arrange the priorities of all bootable devices.



### 3.7 - Exit Menu

Phoenix cME First BIOS Pro Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
Exit Saving Changes			Item Specific Help		
Exit Discarding Changes			Exit system Setup		
Load Setup Defaults			and save your		
Discard Changes			changes to CMOS.		
Save Changes					

F1 Help	↑ ↓ Select Item	-/+ Change Values	F9 Setup Defaults
Esc Exit	← → Select Menu	Enter Select ► Sub-Menu	F10 Save and Exit

## Exit Saving Changes

This exits BIOS setup after saving the changes made.

## Exit Discarding Changes

This exits BIOS setup after discarding the changes made.

## Load Setup Defaults

Load the factory default values.

## Discard Changes

Discards all changes made without exiting BIOS setup.

## Save Changes

**Saves** Saves all changes made without exiting BIOS.



## Chapter 4: Diagnostics

---

If you experience problems with setting up your system, always check the following things in the following order:

### Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the TYAN® website at: <http://www.TYAN.com>.

### 4.1 - Beep Codes

Fatal errors, which halt the boot process, are communicated through two kinds of audible beeps.

- A single long beep followed by two short beeps: It indicates that a Video error has occurred.
- A single long beep repeatedly: It indicates that a DRAM error has occurred. The most common type of error is a memory error.

Before contacting your vendor or TYAN® Technical Support, be sure that you note as much as you can about the beep code length and order that you experience. Also, be ready with information regarding add-in cards, drives and O/S to speed the support process and come to a quicker solution.

### 4.2 - Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the TYAN® web site:

<http://www.TYAN.com/>

#### Note:

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Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. TYAN® does not have a policy for replacing BIOS chips directly with end users. In no event will TYAN® be held responsible for damages done by the end user.



### 4.3 - BIOS Post Code

Code	Beeps / Description	Code	Beeps / Description
02h	Verify Real Mode	32h	Test CPU bus-clock frequency
03h	Disable Non-Maskable Interrupt (NMI)	33h	Initialize Phoenix Dispatch Manager
04h	Get CPU type	36h	Warm start shut down
06h	Initialize system hardware	38h	Shadow system BIOS ROM
08h	Initialize chipset with initial POST values	3Ah	Autosize cache
09h	Set IN POST flag	3Ch	Advanced configuration of chipset registers
0Ah	Initialize CPU registers	3Dh	Load alternate registers with CMOS values
0Bh	Enable CPU cache	42h	Initialize interrupt vectors
0Ch	Initialize caches to initial POST values	45h	POST device initialization
0Eh	Initialize I/O component	46h	2-1-2-3. Check ROM copyright notice
0Fh	Initialize the local bus IDE	48h	Check video configuration against CMOS
10h	Initialize Power Management	49h	Initialize PCI bus and devices
11h	Load alternate registers with initial POST values	4Ah	Initialize all video adapters in system
12h	Restore CPU control word during warm boot	4Bh	QuietBoot start (optional)
13h	Initialize PCI Bus Mastering devices	4Ch	Shadow video BIOS ROM
14h	Initialize keyboard controller	4Eh	Display BIOS copyright notice
16h	1-2-2-3. BIOS ROM checksum	50h	Display CPU type and speed
17h	Initialize cache before memory autosize	51h	Initialize EISA board
18h	8254 timer initialization	52h	Test keyboard
1Ah	8237 DMA controller initialization	54h	Set key click if enabled
1Ch	Reset Programmable Interrupt Controller	58h	2-2-3-1. Test for unexpected interrupts
20h	1-3-1-1. Test DRAM refresh	59h	Initialize POST display service
22h	1-3-1-3. Test 8742 KBD Controller	5Ah	Display prompt "Press F2 to enter SETUP"
24h	Set ES segment register to 4 GB	5Bh	Disable CPU cache
26h	Enable A20 line	5Ch	Test RAM between 512 and 640 KB
28h	Autosize DRAM	60h	Test extended memory
29h	Initialize POST Memory Manager	62h	Test extended memory address lines
2Ah	Clear 512 KB base RAM	64h	Jump to UserPatch1
2Ch	1-3-4-1. RAM failure on address	66h	Configure advanced cache registers
2Eh	1-3-4-3. RAM failure on data bits of low byte of memory bus	67h	Initialize Multi Processor APIC
2Fh	Enable cache before system BIOS shadow	68h	Enable external and CPU caches
30h	1-4-1-1. RAM failure on data bits of high byte of memory bus	69h	Setup System Management Mode (SMM) area



Code	Beeps / Description	Code	Beeps / Description
6Ah	Display external L2 cache size	A2h	Check key lock
6Bh	Load custom defaults (optional)	A4h	Initialize Typematic rate
6Ch	Display shadow-area message	A8h	Erase F2 prompt
6Eh	Display possible high address for UMB recovery	AAh	Scan for F2 key stroke
70h	Display error messages	ACH	Enter SETUP
72h	Check for configuration errors	Aeh	Clear Boot flag
76h	Check for keyboard errors	B0h	Check for errors
7Ch	Set up hardware interrupt vectors	B2h	POST done - prepare to boot operating system
7Eh	Initialize coprocessor if present	B4h	One short beep before boot
80h	Disable onboard Super I/O ports and IRQs	B5h	Terminate QuietBoot (optional)
81h	Late POST device initialization	B6h	Check password (optional)
82h	Detect and install external RS232 ports	B9h	Prepare Boot
83h	Configure non-MCD IDE controllers	BAh	Initialize DMI parameters
84h	Detect and install external parallel ports	BBh	Initialize PnP Option ROMs
85h	Initialize PC-compatible PnP ISA devices	BCh	Clear parity checkers
86h	Re-initialize onboard I/O ports.	BDh	Display MultiBoot menu
87h	Configure Motherboard Devices	BEh	Clear screen (optional)
88h	Initialize BIOS Data Area	BFh	Check virus and backup reminders
89h	Enable Non-Maskable Interrupts (NMIs)	C0h	Try to boot with INT 19
8Ah	Initialize Extended BIOS Data Area	C1h	Initialize POST Error Manager (PEM)
8Bh	Test and initialize PS/2 mouse	C2h	Initialize error logging
8Ch	Initialize floppy controller	C3h	Initialize error display function
8Fh	Determine number of ATA drives (optional)	C4h	Initialize system error handler
90h	Initialize hard-disk controllers	C5h	PnPnd dual CMOS (optional)
91h	Initialize local-bus hard-disk controllers	C6h	Initialize notebook docking (optional)
92h	Jump to UserPatch2	C7h	Initialize notebook docking late
93h	Build MPTABLE for multi-processor boards	C8h	Force check (optional)
95h	Install CD ROM for boot	C9h	Extended checksum (optional)
96h	Clear huge ES segment register	D2h	BIOS Boot Block
97h	Fixup Multi Processor table	E0h	BIOS Boot Block
98h	1-2. Search for option ROMs.	E1h	BIOS Boot Block
99h	Check for SMART Drive (optional)	E2h	Initialize the CPU
9Ah	Shadow option ROMs	E3h	Initialize system timer
9Ch	Set up Power Management	E4h	Initialize system I/O
9Dh	Initialize security engine (optional)	E5h	Check force recovery boot
9Eh	Enable hardware interrupts	E6h	Checksum BIOS ROM
9Fh	Determine number of ATA and SCSI drives	E7h	Go to BIOS
A0h	Set time of day	E8h	Set Huge Segment



Code	Beeps / Description	Code	Beeps / Description
E9h	Initialize Multi Processor	F1h	Initialize Run Time Clock
EAh	Initialize OEM special code	F2h	Initialize video
EBh	Initialize PIC and DMA	F3h	Initialize System Management Mode
ECh	Initialize Memory type	F4h	Output one beep before boot
EDh	Initialize Memory size	F5h	Boot to Mini DOS
EEh	Shadow Boot Block	F6h	Clear Huge Segment
EFh	System memory test	F7h	Boot to Full DOS
F0h	Initialize interrupt vectors		



## Appendix: How to Make a Driver Diskette

Follow the steps below to make a driver diskette from the TYAN® driver CD provided.

1. Start the system and insert the TYAN® CD into the CD-ROM drive to boot from CD. You will see the following menu. Then press [1] and [Enter] to boot the system to TYAN® diskette maker. (If you would like to boot from hard disk, press 0 and Enter or just wait for 10 seconds to boot automatically from hard disk.).

```
Boot from CD:

ISOLINUX 2.00 2002-10-25 Copyright (C) 1994-2002 H. Peter Anvin
0) Boot from first hard drive
1) Boot to TYAN diskette maker
boot: 1_
```

2. Choose the chipset vender which you need from the main menu.

```
TYAN Driver Diskette Maker V1.0

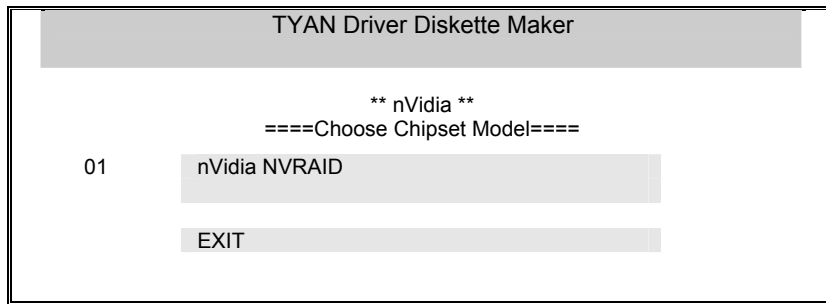
** Main Menu**
====Choose Chipset Vendor====

01  Adaptec
02  Intel
03  LSI
04  nVidia
05  Promise
06  Silicon Image
07  VIA

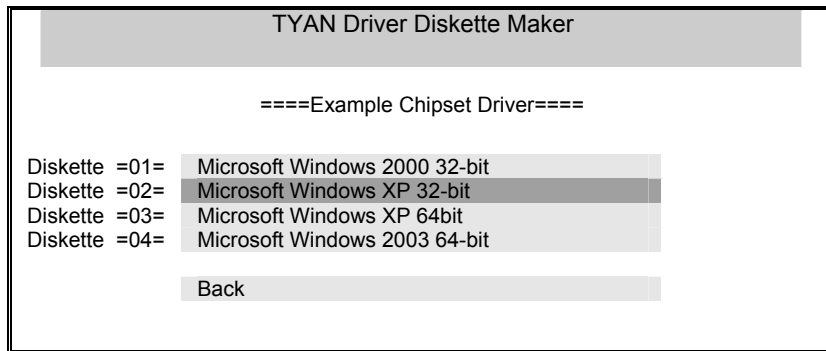
EXIT
```



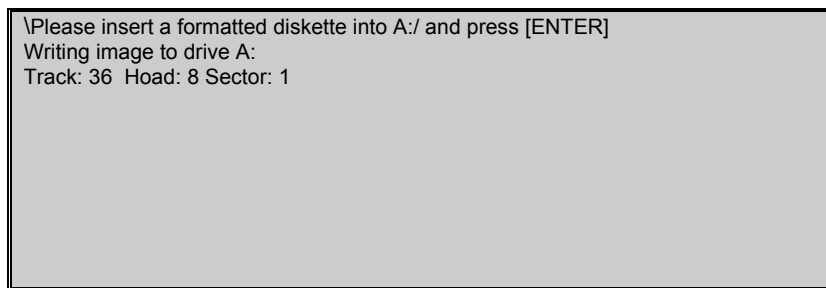
3. The following picture pops up after selecting the chipset model.



4. After selecting the chipset model, select the OS to start the diskette making.



5. Follow the instruction on menu to insert a diskette and press [ENTER].



6. Using "ESC" key to quit the TYAN® diskette maker. The system will automatically restart.



## Glossary

**ACPI (Advanced Configuration and Power Interface):** a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

**AGP (Accelerated Graphics Port):** a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs only at 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

**ATAPI (AT Attachment Packet Interface):** also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

**ATX:** the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

**Bandwidth:** refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path can carry. Greater bandwidth results in greater speed.

**BBS (BIOS Boot Specification):** a feature within the BIOS that creates, prioritizes, and maintains a list of all Initial Program Load (IPL) devices, and then stores that list in NVRAM. IPL devices have the ability to load and execute an OS, as well as provide the ability to return to the BIOS if the OS load process fails. At that point, the next IPL device is called upon to attempt loading of the OS.

**BIOS (Basic Input/Output System):** the program that resides in the ROM chip, which provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

**Buffer:** a portion of RAM which is used to temporarily store data; usually from an application though it is also used when printing and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it to a disk drive. While this improves system performance (reading to or writing from a disk drive a single time is much faster than doing so repeatedly) there is the possibility of



losing your data should the system crash. Information in a buffer is temporarily stored, not permanently saved.

**Bus:** a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

**Bus mastering:** allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

**Cache:** a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times since the information is stored in SRAM instead of slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

**Closed and open jumpers:** jumpers and jumper pins are active when they are "on" or "closed", and inactive when they are "off" or "open".

**CMOS (Complementary Metal-Oxide Semiconductors):** chips that hold the basic startup information for the BIOS.

**COM port:** another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

**DDR (Double Data Rate):** a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

**DIMM (Dual In-line Memory Module):** faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

**DIMM bank:** sometimes called DIMM socket because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

**DMA (Direct Memory Access):** channels that are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.



**DRAM (Dynamic RAM):** widely available, very affordable form of RAM which loses data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

**ECC (Error Correction Code or Error Checking and Correcting):** allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

**EEPROM (Electrically Erasable Programmable ROM):** also called Flash BIOS, it is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. TYAN®'s BIOS updates can be found at <http://www.TYAN.com>

**ESCD (Extended System Configuration Data):** a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

**Firmware:** low-level software that controls the system hardware.

**Form factor:** an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX.

**Global timer:** onboard hardware timer, such as the Real-Time Clock (RTC).

**HDD:** stands for Hard Disk Drive, a type of fixed drive.

**H-SYNC:** controls the horizontal synchronization/properties of the monitor.

**HyperTransport™:** a high speed, low latency, scalable point-to-point link for interconnecting ICs on boards. It can be significantly faster than a PCI bus for an equivalent number of pins. It provides the bandwidth and flexibility critical for today's networking and computing platforms while retaining the fundamental programming model of PCI.

**IC (Integrated Circuit):** the formal name for the computer chip.

**IDE (Integrated Device/Drive Electronics):** a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

**IDE INT (IDE Interrupt):** Hardware interrupt signal that goes to the IDE.



**I/O (Input/Output):** the connection between your computer and another piece of hardware (mouse, keyboard, etc.)

**IRQ (Interrupt Request):** an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ lines can lock up your system. Plug-n-Play operating systems can take care of these details for you.

**Latency:** the amount of time that one part of a system spends waiting for another part to catch up. This occurs most commonly when the system sends data out to a peripheral device and has to wait for the peripheral to spread (peripherals tend to be slower than onboard system components).

**NVRAM:** ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

**Parallel port:** transmits the bits of a byte on eight different wires at the same time.

**PCI (Peripheral Component Interconnect):** a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

**PCI PIO (PCI Programmable Input/Output) modes:** the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

**PCI-to-PCI Bridge:** allows you to connect multiple PCI devices onto one PCI slot.

**Pipeline burst SRAM:** a fast secondary cache. It is used as a secondary cache because SRAM is slower than SDRAM, but usually larger. Data is cached first to the faster primary cache, and then, when the primary cache is full, to the slower secondary cache.

**PnP (Plug-n-Play):** a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

**PXE (Preboot Execution Environment):** one of four components that together make up the Wired for Management 2.0 baseline specification. PXE was



designed to define a standard set of preboot protocol services within a client with the goal of allowing networked-based booting to boot using industry standard protocols.

**RAID (Redundant Array of Independent Disks):** a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly and multiple hard drives will appear as a single drive to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

**RAIDIOS:** RAID I/O Steering (Intel)

**RAM (Random Access Memory):** technically refers to a type of memory where any byte can be accessed without touching the adjacent data and is often referred to the system's main memory. This memory is available to any program running on the computer.

**ROM (Read-Only Memory):** a storage chip which contains the BIOS; the basic instructions required to boot the computer and start up the operating system.

**SDRAM (Synchronous Dynamic RAM):** called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

**Serial port:** called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

**SCSI Interrupt Steering Logic (SISL):** Architecture that allows a RAID controller, such as AcceleRAID 150, 200 or 250, to implement RAID on a system board-embedded SCSI bus or a set of SCSI busses. SISL: SCSI Interrupt Steering Logic (LSI) (only on LSI SCSI boards)

**Sleep/Suspend mode:** in this mode, all devices except the CPU shut down.

**SDRAM (Static RAM):** unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

**SLI (Scalable Link Interface):** NVIDIA SLI technology links two graphics cards together to provide scalability and increased performance. NVIDIA SLI takes



advantage of the increased bandwidth of the PCI Express bus architecture, and features hardware and software innovations within NVIDIA GPUs (graphics processing units) and NVIDIA MCPs (media and communications processors). Depending on the application, NVIDIA SLI can deliver as much as two times the performance of a single GPU configuration.

**Standby mode:** in this mode, the video and hard drives shut down; all other devices continue to operate normally.

**UltraDMA-33/66/100:** a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without a proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

**USB (Universal Serial Bus):** a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

**VGA (Video Graphics Array):** the PC video display standard

**V-SYNC:** controls the vertical scanning properties of the monitor.

**ZCR (Zero Channel RAID):** PCI card that allows a RAID card to use the onboard SCSI chip, thus lowering cost of RAID solution

**ZIF Socket (Zero Insertion Force socket):** these sockets make it possible to insert CPUs without damaging the sensitive CPU pins. The CPU is lightly placed in an open ZIF socket, and a lever is pulled down. This shifts the processor over and down, guiding it into the board and locking it into place.



## Technical Support

If a problem arises with your system, you should first turn to your dealer for direct support. Your system has most likely been configured or designed by them and they should have the best idea of what hardware and software your system contains. Hence, they should be of the most assistance for you. Furthermore, if you purchased your system from a dealer near you, take the system to them directly to have it serviced instead of attempting to do so yourself (which can have expensive consequences).

If these options are not available for you then TYAN® Computer Corporation can help. Besides designing innovative and quality products for over a decade, TYAN® has continuously offered customers service beyond their expectations. TYAN®'s website ([www.TYAN.com](http://www.TYAN.com)) provides easy-to-access resources such as in-depth Linux Online Support sections with downloadable Linux drivers and comprehensive compatibility reports for chassis, memory and much more. With all these convenient resources just a few keystrokes away, users can easily find the latest software and operating system components to keep their systems running as powerful and productive as possible. TYAN® also ranks high for its commitment to fast and friendly customer support through email. By offering plenty of options for users, TYAN® serves multiple market segments with the industry's most competitive services to support them.

**“TYAN®'s tech support is some of the most impressive we've seen, with great response time and exceptional organization in general”**

----Anandtech.com

### Help Resources:

1. See the beep codes section of this manual.
2. See the TYAN® website for FAQ's, bulletins, driver updates, and other information: <http://www.TYAN.com>
3. Contact your dealer for help BEFORE calling TYAN®.
4. Check the TYAN® user group:  
[alt.comp.periphs.mainboard.TYAN](http://alt.comp.periphs.mainboard.TYAN)

### Returning Merchandise for Service

During the warranty period, contact your distributor or system vendor FIRST for any product problems. This warranty only covers normal customer use and does not cover damages incurred during shipping or failure due to the alteration, misuse, abuse, or improper maintenance of products.



**Note:**

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You may obtain service by calling the manufacturer for a Return Merchandise Authorization (RMA) number. The RMA number should be prominently displayed on the outside of the shipping carton and the package should be mailed prepaid. TYAN® will pay to have the board shipped back to you.

**Notice for the USA**

Compliance Information Statement (Declaration of Conformity Procedure) DoC  
FCC Part 15: This device complies with part 15 of the FCC Rules

**Operation is subject to the following conditions:**

This device may not cause harmful interference, and this device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and the receiver.

Plug the equipment into an outlet on a circuit different from that of the receiver.

Consult the dealer on an experienced radio/television technician for help.

**Notice for Canada**

This apparatus complies with the Class B limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations. (Cet appareil est conforme aux normes de Classe B d'interférence radio tel que spécifié par le Ministère Canadien des Communications dans les règlements d'interférence radio.)

**CAUTION:** Lithium battery included with this board. Do not puncture, mutilate, or dispose of battery in fire. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.

**Document #: D1988 - 100**